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Declarations under Rule 4.17:

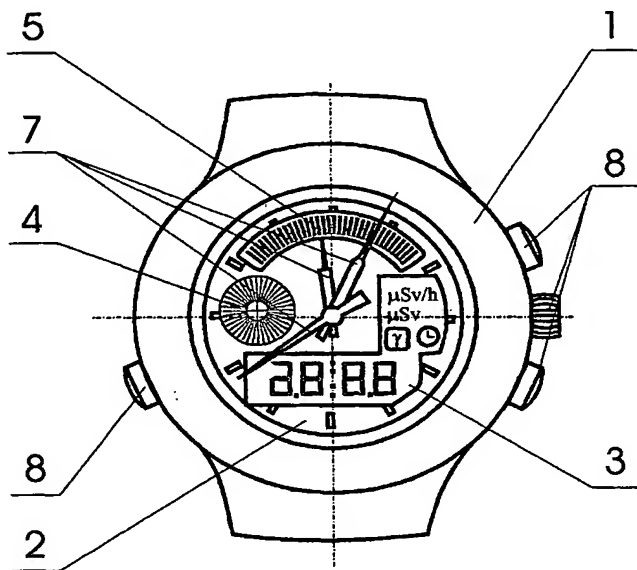
- *as to the identity of the inventor (Rule 4.17(i)) for all designations*
- *of inventorship (Rule 4.17(iv)) for US only*

Published:

- *with international search report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: **PORTABLE WATCH WITH RADIATION MONITOR**



(57) Abstract: The invention relates to combined individual devices which combine timekeeping functions with monitoring of the radiation dosage to which the user is exposed and of radiation intensity. The aim of current invention is to use Geiger-Muller counter as a radiation detector in individual wristwatch and to ensure its functioning over a long period of time. A voltage changer able to change tension from 1,5V - 3V to 400V is needed to make the Geiger-Muller counter function in wristwatch and other compact devices. This was realized by installing in the certain wristwatch a Geiger-Muller counter functioning as a radiation detector and a voltage pulse converter for GeigerMuller counter power supply; and the micro controller was connected to the voltage changer. The problem put by is solved also in the following way: in known method of converting low voltage into high constant voltage at opening the switch key, the return impulse voltage at primary winding is being compared with the predetermined value and frequency of switch key control impulse is being changed depending on the presence of impulse at the threshold device, here switch key control impulses come from

micro controller; and when the signal from the Geiger-Muller counter is received, an additional switch key control impulse is sent. The problem put by is solved also by installing the threshold element in the transformer primary winding of the compact voltage changer. This threshold element is connected to micro controller, while micro controller data bus is connected to unipolar transistor base. There are also other distinctions from the prototype. Research revealed that the device ensures high accuracy of measurement and the functioning period of the device fed by one power supply item is up to one year.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/BY 03/00006

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 G01T1/02 G01T1/18

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G01T

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, INSPEC, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CH 671 469 A (JOHN TOBLER) 31 August 1989 (1989-08-31)	1
Y	page 2, column 1, line 41 - column 2, line 54	4
X	US 5 469 412 A (WEISE EDGAR H) 21 November 1995 (1995-11-21) abstract column 1, line 64 - column 2, line 2 column 2, line 59 column 3, line 1 - line 34 figures ----- -/--	3

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *&* document member of the same patent family

Date of the actual completion of the international search

23 August 2004

Date of mailing of the international search report

03.09.04

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/BY 03/00006

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 4 596 933 A (BJARKE GEORGE O ET AL) 24 June 1986 (1986-06-24)	4
A	abstract column 1, line 40 - line 54 column 2, line 48 - line 65 column 3, line 52 - line 62 figures	5
A	----- US 4 191 886 A (BASSO MICHAEL J ET AL) 4 March 1980 (1980-03-04) abstract column 1, line 30 - line 51 column 2, line 4 - column 3, line 4 figures	1,6-8
A	----- US 3 657 540 A (MAILLOT JEAN-PAUL) 18 April 1972 (1972-04-18) abstract column 1, line 74 - column 2, line 10 column 2, line 25 - line 38 column 2, line 57 - column 3, line 45 figures	6

INTERNATIONAL SEARCH REPORT

International application No.
PCT/BY 03/00006

Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claim: 1 2

A watch combined with a Geiger-Muller(GM) radiation monitor within a casing.

2. claim: 3

A watch and radiation detector combination powered by two independent and separate power supplies

3. claim: 4

A pulse former for the Geiger-Muller counter

4. claim: 5

A filter rectifier for the Geiger-Muller counter

5. claims: 6-8

A method of converting direct current from low to high tension for a Geiger-Muller counter.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/BY 03/00006

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
CH 671469	A	31-08-1989	CH 671469 A5	31-08-1989
US 5469412	A	21-11-1995	CH 685589 A3	31-08-1995
			DE 59400075 D1	15-02-1996
			EP 0643340 A1	15-03-1995
			ES 2084522 T3	01-05-1996
			JP 7151869 A	16-06-1995
US 4596933	A	24-06-1986	NONE	
US 4191886	A	04-03-1980	CA 1106083 A1	28-07-1981
US 3657540	A	18-04-1972	DE 1952928 A1	30-04-1970
			FR 1589905 A	06-04-1970